Report No: 4786828253
Report Date: 2015-02-23

Test Report Prepared By:

UL, LLC.

Test Report Prepared For:

--Renegade Blade®--

Carbide Brush Cutter Blades

Dated: Feb 26, 2015

Table 1 "List of tests"

Table 2 "Appendix"

Test Location Information	
Name	UL, LLC.
Address	12 Laboratory Drive Research Triangle Park Durham, North Carolina 27709-3995
Client Information	
Name	B&G International LLC
Address	3514 E Roosevelt Ave., Tacoma, WA 98404
Report Information	
Report Number	4786828253
Report Date	2015-02-23
Standard References	**N/A**
Product Information	
Type	Carbide Tipped Saw Blade
Product	Circular Brush Cutter Saw Blade [8-inch diameter - 80 teeth]
Testing Engineer	
Name/Signature	Daniel J. Carter
Laboratory Review	
Name/Signature	Judson P. Jaggers Sr.

General Information

Information conveyed by this Report applies only to the test sample(s) actually tested. UL Company did not select the sample(s), determine whether the sample(s) was representative of production sample(s), nor was UL provided with information relative to the formulation or identification of component materials used in the test sample(s).

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UL, LLC. INTERNAL DATA

Sample Identification

Sample No.	Sample Identification Number	Date Received	Product Description /Serial Number
1	2062735 (RB-8-80t)	2015-02-18	Circular Brush Cutter Saw Blade [8-inch diameter – 80 teeth]

Table 1 "Sample identification list"

Report No: 4786828253
Report Date: 2015-02-23

UL, LLC. INTERNAL DATA			
Tested by:	Judson P. Jaggers Sr	Test Date:	2015-02-25
Sample Tested:	RB-8-80t **-1**	Instrument Code/Range:	MG1305-ICO(tape measure), WE1156-ICO (2 inch impact ball)

ENVIRONMENTAL CONDITIONS

Humidity/ [%r.H]	Barometric Pressure / [mBar]	Ambient / [°C]	Date
27	1000	23.0	2015-02-25

CIRCULAR BRUSH CUTTER SAW BLADE IMPACT TEST

Description and Setup

Two samples of the carbide tipped circular saw blade No. _[RB-8-80t-1,2],, __0.0525__ in. thick were mounted in a vise with a steel rod through the center arbor hole. A 2 in. (50.8 mm) diameter steel ball weighing 1.18 lb (0.535 kg) was dropped 5 ft. onto the carbide tips (teeth) in a direction perpendicular to the vise top surface. For each blade, each of three (3) separate carbide tips (teeth) were impacted.

Sample No.	Area of Impact	Observations
1	0.0 deg	Blade tip dulled, not cracked
	60.0 deg	Blade tip dulled, not cracked
	240.0 deg	Blade tip dulled, not cracked
2	0.0 deg	Blade tip dulled, not cracked
	120.0 deg	Blade tip dulled, not cracked
	240.0 deg	Blade tip dulled, not cracked

Table 2 Results " CIRCULAR SAW BLADE IMPACT TEST "

Results - There was **NO** separation of the carbide tips from the blade at the bonded joint.

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UL, LLC. INTERNAL DATA			
Tested by:	Judson P. Jaggers Sr	Test Date:	2015-03-12
Sample Tested:	RB-8-80t -10	Instrument Code/Range:	TA0112; RPM TD0337; seconds

ENVIRONMENTAL CONDITIONS

Humidity/ [%r.H]	Barometric Pressure / [mBar]	Ambient / [°C]	Date
42	1013	23.0	2015-03-12

OVERSPEED TEST – of Blade Teeth and Blade Disc integrity

Description and Setup

Rotate one sample of blade for 1,000,000 revolutions at maximum testing equipment allowable speed.

Afterwards, examine blade after completion of test to ensure blade is intact and not visibly damaged.

Sample No.	Intact (Y/N)	Observations
1	Y	See Results below

Table 3 Results "OVERSPEED TEST"

LAB NOTE: The blade was rotated @ 5200 RPMs. No damage was observed or teeth dislodged following 1,000,000 revolutions. PJ, 2015-03-12.

Results: The [RB-8-80t-] blade was rotated @ 5200 RPMs. After the 1,000,000 revolutions, **NO** damage was observed; including no teeth being dislodged and no blade disc warping.

UL, LLC. INTERNAL DATA			
Tested by:	Judson P. Jaggers Sr.	Test Date:	2015-03-11
Sample Tested:	RB-8-80t -6,7,8,9	Instrument Code/Range:	85406;0-99.999 seconds WD0036; lbs. TA0112; RPM

ENVIRONMENTAL CONDITIONS

Humidity/ [%r.H]	Barometric Pressure / [mBar]	Ambient / [°C]	Date
32	1014	22.5	2015-03-11

ENDURANCE OF BLADE TEETH SHARPNESS

Description and Setup

LAB NOTE:

Two separate blade speeds were tested at the indicated speeds: 4000 RPMs & 5200 RPMs

Two separate 2 inch diameter wood dowels were tested at each speed: 1-Hemlock & 1-Red Oak

PROCEDURE: To test the blade teeth sharpness as measured by gradual [decline] of sharpness over cutting time, the following testing was performed.

TEST**:** First verifying speed is correct, then cutting through 1 sample of 2 in. wood dowel, recording the time to cut completely through the dowel. The applied force of the wood dowel against the blade during entire cutting was maintained at a constant [one pound] of pressure. Next, the cutting time was measured and recorded. Such cuts were repeated 40 times in succession looking for cutting time (in seconds) to gradually increase, implying blade sharpness [decline].

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Results: 4000 RPMs

Speed Slow
RPM = 4000
Blade RB-8-80t -6 used for Hemlock
Blade RB-8-80t -8 used for Red Oak
Force = 1.0 lbs

	2" Hemlock Seconds	2" Red Oak Seconds		2" Hemlock Seconds	2" Red Oak Seconds
1	3.7	6.7	26	3.8	6.6
2	3.5	7.1	27	3.5	6.6
3	3.7	6.8	28	3.9	6.4
4	3.7	6.7	29	3.9	6.8
5	3.6	6.7	30	3.9	6.6
6	3.7	6.8	31	3.8	6.5
7	3.9	6.2	32	3.9	6.6
8	3.7	6.5	33	3.7	6.6
9	3.6	6.5	34	3.6	6.4
10	3.8	6.4	35	3.8	6.7
11	3.9	6.4	36	3.9	6.6
12	3.6	6.4	37	3.7	6.7
13	3.6	6.3	38	3.8	6.4
14	3.6	6.4	39	3.7	6.5
15	3.6	6.5	40	3.9	6.5
16	3.9	6.6	41		
17	3.8	7.1	42		
18	3.6	6.6	43		
19	3.9	6.4	44		
20	3.7	6.6	45		
21	3.6	7.2	46		
22	3.6	6.9	47		
23	3.5	6.9	48		
24	3.5	6.6	49		
25	3.7	6.7	50		

Table 4 Results "Endurance Test"

Report No: 4786828253
Report Date: 2015-02-23

Results: 5200 RPMs

Speed Hi
RPM = 5200
Blade RB-8-80t -7 used for Hemlock
Blade RB-8-80t -9 used for Red Oak
Force = 1.0 lbs

	2" Hemlock Seconds	2" Red Oak Seconds		2" Hemlock Seconds	2" Red Oak Seconds
1	3.6	5.8	26	2.9	3.6
2	3.6	6.5	27	3.1	3.7
3	3.3	4.8	28	3.0	4.0
4	3.3	5.1	29	2.7	3.9
5	3.3	4.8	30	2.9	3.8
6	3.2	4.4	31	2.6	4.1
7	3.1	4.2	32	2.8	4.2
8	2.9	4.0	33	2.8	4.3
9	2.8	4.0	34	3.0	3.6
10	3.0	3.9	35	3.1	4.2
11	2.8	3.8	36	2.9	4.2
12	2.8	3.9	37	3.2	3.9
13	2.9	4.4	38	2.9	4.0
14	2.8	4.2	39	2.8	4.2
15	2.7	4.0	40	2.6	4.0
16	2.6	4.4	41		
17	2.6	3.8	42		
18	2.8	3.8	43		
19	2.7	3.8	44		
20	2.9	3.6	45		
21	2.8	3.8	46		
22	2.6	4.0	47		
23	2.6	3.8	48		
24	2.5	4.0	49		
25	2.7	3.8	50		

Table 5 Results "Endurance Test"

RESULTS: **NO** major increase in time to cut through dowel was noticed after 40 cuts. Both hardwood and softwood was used as reference material. After 40 cuts through each, there was **NO** noticeable increase in time required to cut through wood nor was there a noticeable decline in the performance of the blade.

LAB NOTE regarding WOOD DOWELS used:

THICKNESS: The Lab purposely did not cut square wood products but instead opted for round wood dowels to best simulate tree branches (limbs) encountered in field conditions. The Lab chose 2 inch diameter dowels as a fair thickness avoiding thinner (e.g. 1 inch) so as not to skew false favorable results.

JANKA WOOD HARDNESS: The Lab chose 2 [Janka] wood hardness levels that would simulate a wide range of tree hardness types encountered in field conditions. We purposely avoided soft pine so as not to skew false favorable results.

Wood Hardness used:

[Hemlock -- Janka hardness rated @ 500]
[Red Oak -- Janka hardness rated @ 1290]

Report No: 4786828253
Report Date: 2015-02-23

UL, LLC. INTERNAL DATA			
Tested by:	Judson P. Jaggers Sr	Test Date:	2015-02-26
Sample Tested:	RB-8-80t -11,6,2,4,5	Instrument Code/Range:	TA0112 – Tachometer (RPM's)

ENVIRONMENTAL CONDITIONS

Humidity/ [%r.H]	Barometric Pressure / [mBar]	Ambient / [°C]	Date
36.0	986	22.0	2015-03-16

DURABITLITY of CARBIDE TEETH – STEEL PIPE

Description and Setup

LAB NOTE: A Stihl FS110R Garden Trimmer was fitted with the blades provided for testing. Blade RPM was approximately 7200 for each test. PJ, 2015-02-26.

PROCEDURE: Three (3) separate tests were used in this section to test the [durability] of the carbide teeth. Durability is defined as teeth not becoming chipped, cracked or dislodged from blade disc.

TEST #1 - Blade **OBSTRUCTION** Test: Firmly move blade into 2 inch diameter metal pipe while rotating at 7200 RPMs to stimulate blade hitting metal post (metal fencing) during usage then examine blade after impact.

RESULTS: Sample [RB-8-80t-11,6,2] -- Metal pipe was used to simulate a metal post that might be encountered in field conditions.
Sample #11 -- **NO** damage
Sample #6 – One (1) carbide tooth missing after impact
Sample #2 -- Two (2) carbide teeth missing after impact
PJ, 2105-03-16

DURABITLITY of CARBIDE TEETH - CONCRETE

Description and Setup

LAB NOTE: A Stihl FS110R Garden Trimmer was fitted with the blades provided for testing. Blade RPM was approximately 7200 for each test. PJ, 2015-02-26.

TEST #2 - Blade **STOPPAGE** Test: Firmly move blade into concrete slab while rotating at 7200 RPMs to simulate blade hitting rock/concrete during usage. Examine blade after impact.

RESULTS: Sample [RB-8-80t-4] -- Sample blade struck concrete 1 time and **NO** teeth were dislodged. There was **NO** discernible drop in blade performance after contacting the concrete. PJ, 2015-02-26

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DURABITLITY of CARBIDE TEETH - STEEL BALL

Description and Setup

LAB NOTE: A Stihl FS110R Garden Trimmer was fitted with the blades provided for testing. Blade RPM was approximately 7200 for each test. PJ, 2015-02-26.

TEST #3 - Blade **IMPACT** Test: Impact blade with 1/2" diameter steel ball while rotating at 7200 RPMs to simulate nails and rocks impacting the teeth in field conditions. Examine blade after impact.

RESULTS: Sample [RB-8-80t-5] -- Sample struck 1 time with a one-half inch diameter steel ball, **NO** teeth were dislodged. Only slight deformation of blade was observed. There was **NO** discernible drop in blade performance after contacting steel ball. PJ, 2015-02-26

APPENDIX – INSTRUMENT REFERENCE LIST

All Instruments noted on individual test pages (UL, LLC. INTERNAL DATA).

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